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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/796,965

03/11/2004

Jia-Wei Yang

0941-0932P

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2292

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06/23/2006

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EXAMINER

SCHILLINGER, LAURA M

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 06/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/796,965

Applicant(s)

YANG ET AL.

Examiner

Laura M. Schillinger

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 9-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/11/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Claims 9-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected claims, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 1/13/06.

Applicant's election with traverse of claims 1-8 in the reply filed on 1/13/06 is acknowledged. The traversal is on the ground(s) that claims are never species and claim 9 is generic to elected claim 1. This is not found persuasive because the claims are separate species and claim 9 is not generic because both claims 1 and 9 have mutually exclusive characteristics, that is claim 1 requires a silicon nitride about 500A thick and in contrast claim 9 requires a patterned oxidation mask at least 500 A thick.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Chu et al ('168).

Chu teaches the following claimed limitations as cited below:

1. (Currently Amended) A method of reducing step height comprising: providing a substrate comprising:

a low-voltage device area (L) and high-voltage device area (H) divided by an isolation structure (12) and a pad oxide layer (14) on the surface of the low-voltage device area (L) and high-voltage device area (H) (Fig.2);

sequentially forming a silicon nitride layer of at least about 500A thick (20) and a patterned mask layer (25), exposing the silicon nitride layer on the high-voltage device area (20-H) and parts of the isolation structure adjacent thereto, overlying the substrate (10) (Fig.4-5);

anisotropically etching the exposed silicon nitride layer (20) using the mask layer as an etch mask (25), exposing the high-voltage device area (H) and parts of the isolation structure (12) (Fig.5);

sequentially removing the patterned mask layer and pad oxide from the surface of the high-voltage device area (Col.3, lines: 30-35);

forming a first oxide layer on the exposed high-voltage device area and isolation structure using the silicon nitride layer as an oxidation mask (Col.3, lines: 30-35);

sequentially removing the remaining silicon nitride layer and pad oxide layer from the surface of the low-voltage device area (Col.3, lines: 40-50 and forming a second oxide layer thinner than the first oxide layer, on the low-voltage device layer Col.3, lines: 50-55).

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2. The method as claimed in claim 1, wherein the isolation structure comprises a STI or FOX (STI- Col.3, lines: 1-5).

3. (Original) The method as claimed in claim 1, wherein the first oxide is formed by thermal oxidation (Col.3, lines: 1-5).

4. The method as claimed in claim 1, wherein the first oxide layer thickens gradually to a predetermined value and approximately maintains the thickness in areas further from the low-voltage device structure (Col.3, lines: 15-25).

5. (Original) The method as claimed in claim 1, wherein the first oxide layer is about 1000 to 2000A thick .

6. The method as claimed in claim 1, wherein the second oxide layer is formed by thermal oxidation (Col.3, lines: 1-5- inherent).

7. The method as claimed in claim 1, wherein the second oxide layer is about 32 to 125 A thick (Col.3, lines: 10-25)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al ('168).

In reference to claim 5, Chu teaches method as claimed in claim 1, however fails to explicitly teach wherein the first oxide layer is about 1000 to 2000A thick. However this claim is prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688(Fed. Cir. 1996)(claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al ('168) in further view of MacRae et al ('492).

In reference to claim 8, Chu teaches the method of claim 1, however fails to specify wherein the silicon nitride layer on the low-voltage device area is removed by hot phosphoric acid. However, MacRae teaches the well known use of hot phosphoric acid to etch silicon

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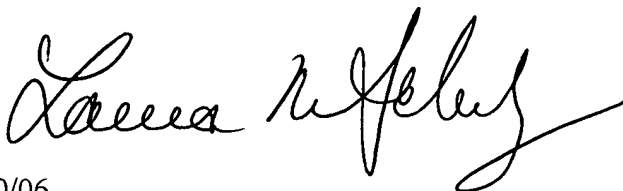
nitride layers (Col.2, lines: 15-25). It would have been obvious to one of ordinary skill in the art to use hot phosphoric acid to remove the silicon nitride layer as taught by MacRae because such use is considered conventional as taught by MacRae (Col.2, lines: 15-25).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M. Schillinger whose telephone number is (571) 272-1697. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Laura M Schillinger
Primary Examiner
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06/20/06